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Modeling the Wind-Fields of Accidental Releases by Mesoscale Forecasting

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The Atmospheric Release Advisory Capability (ARAC) is an emergency preparedness and response organization supported primarily by the Departments of Energy and Defense. ARAC can provide real-time assessments of atmospheric releases of radioactive materials at any location in the world. ARAC uses robust three-dimensional transport and dispersion models, extensive geophysical and dose-factor databases, meteorological data-acquisition systems, and an experienced staff.

The meteorological component of ARAC'S operational modeling system employs real-time observed data from all available sources near the accident site to generate a wind-field for input to the transport and dispersion model. Using purely diagnostic models, there are many atmospheric motions which may not be captured by the calculations. Locally-driven flows within spatially-sparse data networks are a prime example. These considerations suggest that some of ARAC'S un-met meteorological data needs could be met by relatively fine scale spatial data from a *simulation* of the atmospheric boundary layer.

Here we report on simulation studies of past and potential release sites to show that even in the absence of local meteorological observed data, readily available gridded analysis and forecast data-sets from operational weather centers, and a mesoscale weather forecast model, the US Navy Operational Regional Atmospheric Prediction System (NORAPS, Lieu 1994), can be applied at an appropriate grid resolution to simulate complex local flows.

The locales chosen for our initial wind-field simulation studies are the San Francisco Bay Area, the site of a toxic oleum release in July 1993, and the Cape Canaveral\ Kennedy Space Center Area, a site of major rocket launches. We have made multiply nested simulations which focus on these sites, and intense observed data collection campaigns are in progress to form complete verification cases for our new modeling capability.

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